

Food web studies in paleoenvironment

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Recently it has also been pointed out that the nitrogen isotopic compositions of amino acids are useful for estimating the trophic relationship in the ecosystem (McClelland and Montoya, 2002). We found that the metabolic processes strongly control the isotopic compositions of some amino acids (Chikaraishi et al., 2007). Historically, stable nitrogen isotopic composition of whole organisms and their tissues has widely been used in a number of ecological studies, particularly for elucidating trophic position of organisms and nitrogen flow in the food web. However, the ^{15}N -enrichment of whole organisms and tissues along the food web could highly be susceptible to the relative abundance of nitrogen-containing molecules such as amino acids. Our amino acid results on various organisms including tuna (natural and cultivated), salmon, nautilus, omul fish (Lake Baikal), cyprinid fish, gobiid fish, benthic foraminifera, zooplankton in Lake Baikal, crab, rotifer, red algae, etc. represent a general isotopic relationship in amino acids along the aquatic food web (Kashiyama et al., 2005, abstract for Annual Meeting of Japanese Paleontological Society; Ogawa et al., 2006, abstract for Annual Meeting of Japanese Society for Mass Spectrometry; Chikaraishi et al., in prep.). The significant ^{15}N -enrichments in glutamate, valine, isoleucine, and proline provide a scope for defining trophic position, whereas little $\delta^{15}\text{N}$ changes in phenylalanine and methionine provide information of nitrogen sources at the base of the food web. Based on the general trends observed in these organisms, we will evaluate this technique and potential applications for the paleontological samples.

McClelland, J. W. and Montoya, J. P. (2002) *Ecology*, 83, 2173-2180.

Chikaraishi, Y., Kashiyama, Y., Ogawa, N. O., Kitazato, H., and Ohkouchi, N. (2007) *Marine Ecology Progress Series*, in press.